AMENDMENTS TO THE CLAIMS:

Without prejudice, this listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claims 1 to 24. (Canceled).

25. (Currently Amended) [The] A decoding method [or device as recited in claims 1 or 17,] for demodulating a received signal available in serial code concatenation in a code-division multiple access transmission system, a two-step coding being carried out at the transmitting end of the transmission system, the method comprising:

providing a soft-in/soft-out decoder in a receiver of the transmission system, a first decoder step of the soft-in/soft-out decoder including an inner decoder and a Hadamard orthogonal multi-step inner code, a second decoder step of the soft-in/soft-out decoder including an outer decoder and an outer error correcting code of a predefined rate; and

processing soft values as reliability information at an output and an input of the soft-in/soft-out decoder, a soft output of the inner decoder being a soft input for the outer decoder, a channel reliability information output from a preceding demodulation being an input for the inner decoder;

wherein one of the following is satisfied:

(1) a modified soft-decision Viterbi algorithm is used in which reconstruction is performed for coded bits of the outer code, and is not performed for transmitted information bits; and

(2) a maximum a posteriori decoder is used, in which soft information pertaining to calculations of the outer, coded bits is used partially as a priori information for systematic bits of the inner code, so that soft values are fed back to the first decoder;

wherein using logarithmic likelihood algebra, a maximum a posteriori (MAP) decoder for the inner code is expressed by the following first equation:

$$L^I(\hat{u}_k) = \ln \frac{\sum_{x \in C^I, u_k=+1} P(x|y)}{\sum_{x \in C^I, u_k=-1} P(x|y)} = \ln \frac{\sum_{x \in C^I, u_k=+1} \exp(\frac{1}{2}\sum_{i=0}^{N-1} L(x_i;y_i)\cdot x_i)}{\sum_{x \in C^I, u_k=-1} \exp(\frac{1}{2}\sum_{i=0}^{N-1} L(x_i;y_i)\cdot x_i)},$$

where the values satisfy the following second equation:

$$L(xi,yi) = \begin{cases} Le\bullet y_i + L^I(Ui); \ for \ i = \frac{1}{2^{k+1}}N; k=0,\ldots,K-1 \\ Le\bullet y; \ otherwise \end{cases}$$

describe a probability of all elements of the resulting vector, x_i and y_i being Walsh functions, x and y being a vector, C being a code, U_i being a bit.

26. (Currently Amended) The method [or device] as recited in claim 25, wherein the probability is supplemented by an input vector y with probability L_c by a-priori information $L^I(u_i)$ for systematic bits according to the first equation of a code word, wherein the arguments of the exponential function in the second equation are results of correlating a resulting vector with all Walsh functions x_j, j= 0, ..., N-1, the correlation operation for all code words x_j being performed by applying a fast Hadamard transformation to provide a correlation vector w'.

27. (Currently Amended) [The] A decoding method [or device as recited in claims 1 or 17,] for demodulating a received signal available in serial code concatenation in a code-division multiple access transmission system, a two-step coding being carried out at the transmitting end of the transmission system, the method comprising:

providing a soft-in/soft-out decoder in a receiver of the transmission system, a first decoder step of the soft-in/soft-out decoder including an inner decoder and a Hadamard orthogonal multi-step inner code, a second decoder step of the soft-in/soft-out decoder including an outer decoder and an outer error correcting code of a predefined rate; and

processing soft values as reliability information at an output and an input of the soft-in/soft-out decoder, a soft output of the inner decoder being a soft input for the outer decoder, a channel reliability information output from a preceding demodulation being an input for the inner decoder;

wherein one of the following is satisfied:

(1) a modified soft-decision Viterbi algorithm is used in which reconstruction is performed for coded bits of the outer code, and is not performed for transmitted information bits; and

(2) a maximum a posteriori decoder is used, in which soft information pertaining to calculations of the outer, coded bits is used partially as a priori information for systematic bits of the inner code, so that soft values are fed back to the first decoder,

wherein the inner decoder includes a maximum a-posteriori decoder and wherein the a-priori information is made available to the inner decoder as reliability values in an a-priori vector L(u), u being a bit, so that the inner decoder provides L-values for estimated symbols of an inner decoder soft value output vector L(û), an amount $|L(\hat{u}_k)|$ of the L-values indicating a reliability of a respective decision and an operational sign of the $L(\hat{u}_k)$ representing a hard decision, wherein the decoder result for bit $\hat{u}_K$ includes three terms, including a-priori information $L(u_k)$ about the bit to be decoded, channel information $L_c \cdot y_{sys(k)}$ about the bit to be decoded, and extrinsic information L_e(ûk), in which channel information and a-priori information on all other bits of vector **y** or of a transmitted Walsh function are represented by the following equation:

$$L(\hat{u}_k) = L(u_k) + L_c \cdot y_{sys(k)} + \underbrace{\ln \frac{\sum_{j=0, u_k=+1}^{N-1} \exp\left(\sum_{i=0, i \neq sys(k)}^{N-1} L(x_i; y_i) \cdot \frac{1}{2} x_i \right)}{\sum_{j=0, u_k=-1}^{N-1} \exp\left(\sum_{i=0, i \neq sys(k)}^{N-1} L(x_i; y_i) \cdot \frac{1}{2} x_i \right)}}_{L_e(\hat{u}_k)}$$

28. (New) A decoding device for demodulating a received signal available in serial code concatenation in a code-division multiple access transmission system, a two-step coding being carried out at the transmitting end of the transmission system, the device comprising:

a soft-in/soft-out decoder disposed in a receiver of the transmission system, a first decoder step of the soft-in/soft-out decoder including an inner decoder and a Hadamard orthogonal multi-step inner code, a second decoder step of the soft-in/soft-out decoder including an outer decoder and an outer error-correctinge code of a predefined rate, soft

values being processed as reliability information at an output and an input of the soft-in/soft-out decoder, a soft output of the inner decoder being a soft input for the outer decoder, a channel reliability information output from a preceding demodulation being an input for the inner decoder;

wherein one of the following is satisfied:

(1) a modified soft-decision Viterbi algorithm is used in which reconstruction is performed for coded bits of the outer code, and is not performed for transmitted information bits; and

(2) a maximum a posteriori decoder is used, in which soft information pertaining to calculations of the outer, coded bits is used partially as a priori information for systematic bits of the inner code, so that soft values are fed back to the first decoder,

wherein using logarithmic likelihood algebra, a maximum a posteriori (MAP) decoder for the inner code is expressed by the following first equation:

$$L^I(\hat{u}_k) = \ln \frac{\sum_{x \in C^I, u_k=+1} P(x|y)}{\sum_{x \in C^I, u_k=-1} P(x|y)} = \ln \frac{\sum_{x \in C^I, u_k=+1} \exp(\frac{1}{2}\sum_{i=0}^{N-1} L(x_i; y_i) \cdot x_i}{\sum_{x \in C^I, u_k=-1} \exp(\frac{1}{2}\sum_{i=0}^{N-1} L(x_i; y_i) \cdot x_i}$$

where the values satisfy the following second equation:

$$L(xi,yi) = \begin{cases} Le \bullet y_i + L^I(Ui);\ for\ i = \frac{1}{2^{k+1}}N; k = 0,\ldots,K-1 \\ Le \bullet y;\ otherwise \end{cases}$$

describe a probability of all elements of the resulting vector, x_i and y_i being Walsh functions, x and y being a vector, C being a code, U_i being a bit.

29. (New) The device as recited in claim 28, wherein the probability is supplemented by an

input vector y with probability L_c by a-priori information $L^I(u_i)$ for systematic bits according to the first equation of a code word, wherein the arguments of the exponential function in the second equation are results of correlating a resulting vector with all Walsh functions x_j, $j= 0, ..., N-1$, the correlation operation for all code words x_j being performed by applying a fast Hadamard transformation to provide a correlation vector w'.

30. (New) A decoding device for demodulating a received signal available in serial code concatenation in a code-division multiple access transmission system, a two-step coding being carried out at the transmitting end of the transmission system, the device comprising:

a soft-in/soft-out decoder disposed in a receiver of the transmission system, a first decoder step of the soft-in/soft-out decoder including an inner decoder and a Hadamard orthogonal multi-step inner code, a second decoder step of the soft-in/soft-out decoder including an outer decoder and an outer error-correctinge code of a predefined rate, soft values being processed as reliability information at an output and an input of the soft-in/soft-out decoder, a soft output of the inner decoder being a soft input for the outer decoder, a channel reliability information output from a preceding demodulation being an input for the inner decoder;

wherein one of the following is satisfied:

(1) a modified soft-decision Viterbi algorithm is used in which reconstruction is performed for coded bits of the outer code, and is not performed for transmitted information bits; and

(2) a maximum a posteriori decoder is used, in which soft information pertaining to calculations of the outer, coded bits is used partially as a priori information for systematic bits of the inner code, so that soft values are fed back to the first decoder,

wherein the inner decoder includes a maximum a-posteriori decoder and wherein the a-priori information is made available to the inner decoder as reliability values in an a-priori vector L(u), u being a bit, so that the inner decoder provides L-values for estimated symbols of an inner decoder soft value output vector $L(\hat{u})$, an amount $|L(\hat{u}_k)|$ of the L-values indicating a reliability of a respective decision and an operational sign of the $L(\hat{u}_k)$ representing a hard decision, wherein the decoder result for bit $\hat{u}_K$ includes three terms, including a-priori information $L(u_k)$ about the bit to be decoded, channel information $L_c \cdot y_{sys(k)}$ about the bit to be decoded, and extrinsic information $L_e(\hat{u}k)$, in which channel information and a-priori

information on all other bits of vector **y** or of a transmitted Walsh function are represented by the following equation:

$$L(\hat{u}_k) = L(u_k) + L_c \cdot y_{sys(k)} + \underbrace{\ln \frac{\sum\limits_{j=0, u_k=+1}^{N-1} \exp\left(\sum\limits_{i=0, i \neq sys(k)}^{N-1} L(x_i; y_i) \cdot \frac{1}{2} x_i \right)}{\sum\limits_{j=0, u_k=-1}^{N-1} \exp\left(\sum\limits_{i=0, i \neq sys(k)}^{N-1} L(x_i; y_i) \cdot \frac{1}{2} x_i \right)}}_{L_e(\hat{u}_k)}$$